Worked from a previously collected set of 130 soil samples from 11 sites across Liberia and Ghana. Samples were taken at varying depths of both AfDE soils from the sites, as well as non-AfDE adjacent samples (AS) to serve as references.

Samples were previously run on a Netzsch STA 449PC Jupiter simultaneous thermal analyzer equipped with an automatic sample carrier (ASC) and a type-S platinum/ rhodium (Pt/PtRh) sample carrier, producing plots of Temperature vs. Carbon Dioxide concentrations for analysis.

Used the RampedPyrox Python module to create Initial Activation Energy Distributions (IEAD). This uses Tikhonov Regularization to solve a matrix of time/energy data based on the Arrhenius equation.

Used Principal Component Analysis (PCA) to compare Thermal Analysis plots of different soil samples. This allowed comparisons of soils separated by different factors like depth, site location, and soil order.

Conclusion & Future Work

Conclusion
- The distribution of activation energies is closely related to a sample’s thermal analysis curve
- Using RampedPyrox activation energy values is a viable method for showing differences in persistence trends
- Sample characteristics like soil order and site location explain difference in thermal analysis results, whereas site location and country aren’t as useful.

Future Work
- Apply RampedPyrox.py to new set of Ghanaian AfDE/AS soil samples
- Investigate other Activation Energy calculation methods
- Apply more rigorous clustering techniques to PCA results

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References